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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/522,973	02/01/2005	Niall Seamus McDonnell	PU020362	6656

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THOMSON LICENSING INC.
PATENT OPERATIONS
PO BOX 5312
PRINCETON, NJ 08543-5312

EXAMINER	
CHU, GABRIEL L	

ART UNIT	PAPER NUMBER
2114	

DATE MAILED: 06/13/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/522,973	MCDONNELL ET AL.	
	Examiner	Art Unit	
	Gabriel L. Chu	2114	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *01 February 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-11* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-10* is/are rejected.

7)☒ Claim(s) *11* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *01 February 2005* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *20050201*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Priority

The later-filed application must be an application for a patent for an invention which is also disclosed in the prior application (the parent or original nonprovisional application or provisional application). The disclosure of the invention in the parent application and in the later-filed application must be sufficient to comply with the requirements of the first paragraph of 35 U.S.C. 112. See *Transco Products, Inc. v. Performance Contracting, Inc.*, 38 F.3d 551, 32 USPQ2d 1077 (Fed. Cir. 1994).

The disclosure of the prior-filed application, Application No. 60/400635 (herein 635), fails to provide adequate support or enablement in the manner provided by the first paragraph of 35 U.S.C. 112 for one or more claims of this application. Portions of claims 1 and 6 are supported in that 635 discloses a real-time lower level FC/SCSI port driver used for fault handling, placing a real-time kernel and the SCSI port driver between the non-real time kernel and the fabric. Claims 2-5 and 7-11 are not considered to be present in 635.

Drawings

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, in claims 1, 6, the active port and alternative port must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended

replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. **Claims 6-10 rejected under 35 U.S.C. 102(e) as being anticipated by US 20030126315 to Tan et al.** Referring to claim Referring to claim 6, Tan discloses a storage system including at least one storage device for storing digitized information

(Figure 1, storage devices.);

a host system for providing overall control of the media area network (Figure 1, host servers.);

and a host bus adapter for providing a link between the host system and the storage system (Figure 1, host bus adapters.), the method comprising the steps of

monitoring, at a lower-level port driver in the host bus adapter, communication status between the storage system and the host bus adapter (Figure 4, monitor.),

and in the event of failure initiating switching at the lower-level port driver to activate an alternative port, thereby achieving fail-over recovery (Figure 4, failover. Further, from Tan, "[0044] Another failure that may be detected is the failure of the active controller. This problem is detected by a command timeout combined with a failure of a path verification command to the active controller. Detection may also be based on an event notification from the standby controller indicating ICL failure combined with failure of a path verification command to the active controller. The conditions that must be satisfied in one embodiment is that the standby controller is operable and the write cache is synchronized. The failover action in this embodiment is to activate the standby controller and resend all outstanding commands. The event is logged to the host indicating that the controller pair is no longer redundant." and "[0046] The active path may fail which is detected by a number of methods including a command timeout and path verification command timeout, a target logout from the loop or fabric, and a loop or fabric problem reported by the Fibre manager or Fabric control software. A condition that may be set for this failure is that the standby controller is

operable and the write cache is synchronized. The failover actions taken when this condition is found include activating the standby controller, sending previously outstanding and timeout commands, and event notifying the host to indicate the active path failed and path is no longer redundant.").

4. Referring to claim 7, Tan discloses the step of monitoring the communication status between the storage system and the host bus adapter further comprises the step of determining whether the storage system successfully completed at least one command (From paragraph 35, "Path verification in monitoring 410 also occurs when command timeouts are received by the failover mechanisms.").

5. Referring to claim 8, Tan discloses the step of determining whether unsuccessful completion of the at least one command can be corrected by fail-over recovery (Figure 4, elements 430, 440.).

6. Referring to claim 9, Tan discloses the step of scheduling fail-over recovery upon a determination that unsuccessful completion of the at least one command can be corrected by fail-over recovery (From paragraph 12, "For example, failover actions may not be performed when an active path fails at a time when all other available paths have also failed or the standby path has previously been marked or flagged as unusable. The method may include performing load distribution of the paths between the host and the data storage devices and preferably, the method includes enforcing anti-thrashing rules to ensure that failover and failback are not performed more than a set number of time within a monitoring interval (e.g., only initiate failover and/or failback for a particular LUN device or LUN grouping two or three times every 10 to 30 minutes).").

7. Referring to claim 10, Tan discloses queuing requests from an original port that failed to an alternative port; canceling all outstanding requests on the original port; and issuing at least one command via the alternate port(From Tan, "[0044] Another failure that may be detected is the failure of the active controller. This problem is detected by a command timeout combined with a failure of a path verification command to the active controller. Detection may also be based on an event notification from the standby controller indicating ICL failure combined with failure of a path verification command to the active controller. The conditions that must be satisfied in one embodiment is that the standby controller is operable and the write cache is synchronized. The failover action in this embodiment is to activate the standby controller and resend all outstanding commands. The event is logged to the host indicating that the controller pair is no longer redundant." and "[0046] The active path may fail which is detected by a number of methods including a command timeout and path verification command timeout, a target logout from the loop or fabric, and a loop or fabric problem reported by the Fibre manager or Fabric control software. A condition that may be set for this failure is that the standby controller is operable and the write cache is synchronized. The failover actions taken when this condition is found include activating the standby controller, sending previously outstanding and timeout commands, and event notifying the host to indicate the active path failed and path is no longer redundant." Wherein the failed port/controller is no longer redundant, the host is aware, commands are either outstanding or timed out, and so resent, commands are effectively cancelled.).

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. **Claims 1-5 rejected under 35 U.S.C. 103(a) as being unpatentable over US 20030126315 to Tan et al. in view of "real-time" by Microsoft Computer Dictionary (herein MSCD).** Referring to claim 1, Tan discloses a storage system including at least one storage device for storing digitized information (Figure 1, storage devices.);

a host system for providing overall control of the media area network (Figure 1, host servers.);

and a host bus adapter for providing a link between the host system and the storage system (Figure 1, host bus adapters.), the host bus adapter having a lower-level port driver that includes: means for monitoring communications between the storage system and the host bus adapter through an active port (Figure 4, monitor.),

and means for switching to an alternative port, thereby achieving fail-over recovery in the event of a communications failure (Figure 4, failover. Further, from Tan, "[0044] Another failure that may be detected is the failure of the active controller. This problem is detected by a command timeout combined with a failure of a path verification command to the active controller. Detection may also be based on an event notification from the standby controller indicating ICL failure combined with failure of a path verification command to the active controller. The conditions that must be satisfied in one embodiment is that the standby controller is operable and the write cache is

synchronized. The failover action in this embodiment is to activate the standby controller and resend all outstanding commands. The event is logged to the host indicating that the controller pair is no longer redundant." and "[0046] The active path may fail which is detected by a number of methods including a command timeout and path verification command timeout, a target logout from the loop or fabric, and a loop or fabric problem reported by the Fibre manager or Fabric control software. A condition that may be set for this failure is that the standby controller is operable and the write cache is synchronized. The failover actions taken when this condition is found include activating the standby controller, sending previously outstanding and timeout commands, and event notifying the host to indicate the active path failed and path is no longer redundant.").

Although Tan does not specifically disclose that this failover is performed in real time, real time is well known in the art. An example of this is shown by MSCD, "Of or relating to a time frame imposed by external constraints. Real-time operations are those in which the machine's activities match the human perception of time or those in which computer operations proceed at the same rate as a physical or external process." A person of ordinary skill in the art at the time of the invention would have been motivated to use real-time in a failover process because, from MSCD, "a computer must respond to situations as they occur," and further Tan was motivated by speed, from paragraph 8, "Additionally, operating systems often provide hooks for controlling redundancy at improper levels which results in poor error handling and long latencies. Hooks and/or handshaking protocols that are used to allow the host and storage controller to act

cooperatively in failover operations are lacking in industry-standard interconnects (such as SCSI-based interconnects, switches, and hubs), and have presently been built into host firmware via the host device drivers, which has further led to problems as each host and each host OS may implement different hooks and protocols. Many OS models dictate that redundancy control come from components that may introduce undesirable delays and interdependencies." Further, Tan appears to operate at speeds sufficient to meet Applicant's desire for "real time", from paragraph 35, "Monitoring 410 may include performing path verification periodically (e.g., path monitoring time interval of about 1 to 10 seconds or more and more preferably, about every 5 seconds) for each target redundant controller. The monitoring 410 by the failover mechanisms preferably includes monitoring all standby paths within the path monitoring time interval to make sure it is available or "safe" to failover when the path is needed. Path verification in monitoring 410 also occurs when command timeouts are received by the failover mechanisms."

10. Referring to claim 2, Tan discloses the monitoring means further comprises means for determining whether the storage system successfully completed at least one command (From paragraph 35, "Path verification in monitoring 410 also occurs when command timeouts are received by the failover mechanisms.").

11. Referring to claim 3, Tan discloses the monitoring means further comprises means for determining whether unsuccessful completion of the at least one command can be corrected by fail-over recovery (Figure 4, elements 430, 440.).

12. Referring to claim 4, Tan discloses the switching means further comprises means for scheduling fail-over recovery upon determination that unsuccessful completion of the at least one command can be corrected by fail-over recovery (From paragraph 12, "For example, failover actions may not be performed when an active path fails at a time when all other available paths have also failed or the standby path has previously been marked or flagged as unusable. The method may include performing load distribution of the paths between the host and the data storage devices and preferably, the method includes enforcing anti-thrashing rules to ensure that failover and failback are not performed more than a set number of time within a monitoring interval (e.g., only initiate failover and/or failback for a particular LUN device or LUN grouping two or three times every 10 to 30 minutes).").

13. Referring to claim 5, Tan discloses the means for scheduling fail-over recovery further comprises: means for queuing requests from an original port that failed to an alternative port; means for canceling all outstanding requests on the original port; and means for issuing at least one command via the alternate port (From Tan, "[0044] Another failure that may be detected is the failure of the active controller. This problem is detected by a command timeout combined with a failure of a path verification command to the active controller. Detection may also be based on an event notification from the standby controller indicating ICL failure combined with failure of a path verification command to the active controller. The conditions that must be satisfied in one embodiment is that the standby controller is operable and the write cache is synchronized. The failover action in this embodiment is to activate the standby

controller and resend all outstanding commands. The event is logged to the host indicating that the controller pair is no longer redundant." and "[0046] The active path may fail which is detected by a number of methods including a command timeout and path verification command timeout, a target logout from the loop or fabric, and a loop or fabric problem reported by the Fibre manager or Fabric control software. A condition that may be set for this failure is that the standby controller is operable and the write cache is synchronized. The failover actions taken when this condition is found include activating the standby controller, sending previously outstanding and timeout commands, and event notifying the host to indicate the active path failed and path is no longer redundant." Wherein the failed port/controller is no longer redundant, the host is aware, commands are either outstanding or timed out, and so resent, commands are effectively cancelled.).

Allowable Subject Matter

14. Claim 11 objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form **including all of the limitations of the base claim and any intervening claims**. Referring to claim 11, the prior art does not teach or fairly suggest the step of checking whether cancellation of the outstanding commands occurred, and if not then initiating fail-over recovery of any failed storage system controller.

Conclusion

15. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. See notice of references cited, paying particular attention to US 20040078632 to Infante et al. and US 6779064 to McGowen et al.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gabriel L. Chu whose telephone number is (571) 272-3656. The examiner can normally be reached on weekdays between 8:30 AM and 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Scott Baderman can be reached on (571) 272-3644. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Gabriel L. Chu
Examiner
Art Unit 2114

gc